

Bacterial Fruit Blotch of Watermelon

THOMAS ISAKEIT*

Bacterial fruit blotch (BFB) of watermelon is a disease occurring in several U.S. watermelon production areas, particularly in the southeast. It is caused by a bacterium, *Acidovorax avenae* subsp. *citrulli*.

First confirmed in Texas in 1993, BFB has since been documented in almost all areas in the state where watermelons are grown. BFB has occurred sporadically from year to year in these areas, but has affected only a few fields. However, where it has occurred, the yield loss has been high. Losses from this disease are caused by the disfigurement of the rind, but it poses no food safety problem.

Symptoms and diagnosis

Symptoms are most noticeable on mature fruit shortly before harvest. Infected areas (lesions) on the fruit's rind appear water-soaked or oily. Lesions are usually located on top of the fruit, not where it touches the soil. The lesions are just as firm as unaffected rind, and extend into the rind, but not the meat. Lesions on striped fruit tend to be located in

the light-colored stripes. Cracks that sometimes form in more advanced lesions may contain a brown, gummy ooze. Such cracks can allow other organisms to enter and cause fruit decay.

Although symptoms can occur on foliage, they may be subtle or mistaken for another disease. The earliest symptom is water-soaking between the veins on the underside of the seedling cotyledons (seed leaves). These areas eventually dry up and die. On true leaves, the disease can form distinctive, brown, elongated lesions on and next to the veins, which also may appear water-soaked. The bacteria also produce brown, circular spots on the leaves, but similar circular lesions can be caused by a number of other agents.

The large lesions on fruit and angular lesions on true leaves are distinctive for this disease. To confirm the presence of the bacterium, growers can send tissue showing symptoms to a diagnostic laboratory, or they can use commercially available diagnostic kits. Some of these kits are suitable for field use and can detect bacteria on leaf lesions before symptoms occur on fruits. These kits can also be used to determine quickly and reliably the presence of the bacteria in other, less-distinctive lesions.

The kits do not detect bacteria in seed. Seed companies screen for it in seed by growing thousands of seeds of a lot and examining them for symptoms. Although this approach screens out heavily contaminated seed, it is not 100 percent reliable, as cases of BFB have been documented from screened seed.

Disease development

Seed is the most important way to spread the BFB pathogen to areas where it has not occurred before. Most commercial watermelon seed is routinely tested for the BFB pathogen.



Bacterial fruit blotch on mature fruit.

* Assistant Professor and Extension Plant Pathologist, Department of Plant Pathology and Microbiology, The Texas A&M University System

However, very low populations of bacteria on seed, below detection limits, can increase and spread to other plants during the growing season, particularly when transplants are used.

Leaf infection has little or no effect on plant growth, but provides a reservoir of bacteria to infect fruit. Such leaves may not even show any symptoms.

Fruit symptoms occur long after infection. The fruit is susceptible to infection only during flowering and fruit set; lesions appear on fruit shortly before ripening. After harvest, few, if any, lesions develop on fruit, and infection does not spread via contact during fruit transit or storage.

Environmental conditions play a key role in symptom development and disease severity. Rain helps spread bacteria onto developing fruit. Overhead irrigation also encourages the disease to develop. Leaf symptoms tend to occur at high temperatures (for example, higher than 90 degrees).

Once BFB occurs in a field, the bacteria can survive in the seed of infected fruit left in the soil. Volunteer watermelon plants can be a source of bacteria to infect future crops, including other cucurbits such as honeydew melons. Cucurbit weeds, such as a citron melon, are also susceptible to BFB and the bacteria can carry over in seed of this plant.

The bacterium apparently cannot survive for more than a few weeks during summer months without a plant host in the soil. When the infected rind decays, the bacteria die. So far, there is no published evidence that they can carry over on noncucurbit plants (for example, peanuts) or that such plants are of any importance in perpetuating BFB.

Disease management

Bacterial fruit blotch does not affect all watermelon growers. Even if contaminated seed or transplants are used, the disease occurs only if environmental conditions favor its development. Overhead irrigation increases the risk of a BFB epidemic.

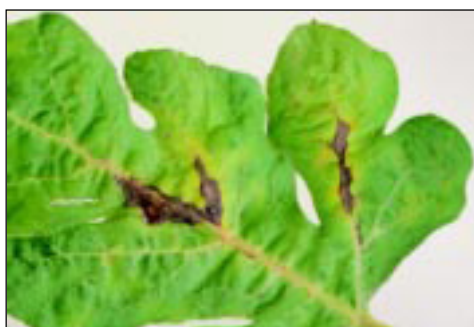
To minimize the risk of BFB, use seed tested for the bacterium. Monitor transplants for symptoms, particularly leaf



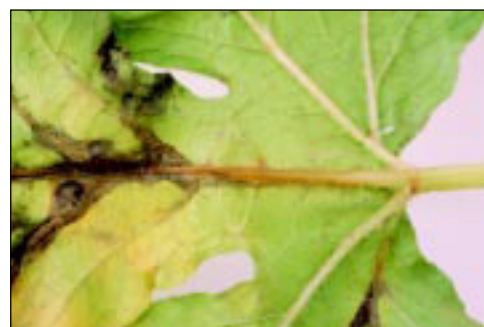
Water-soaking symptom on the underside of a seedling cotyledon.



Angular and circular lesions on the leaves of transplants.



Angular lesions along leaf veins of plants grown in the field.



Water-soaking of leaf veins of plants grown in the field.

spots, although BFB symptoms don't always develop on infected transplants. Do not use plants from infected seed lots.

If infected plants are found in the field, apply copper bactericides (for example, Kocide®) weekly at the full rate to prevent spread of the bacteria. If no symptoms are seen, apply bactericide to plants biweekly at the full rate or weekly at half the recommended rate. As a protective measure, apply sprays starting at flowering, earlier if transplants are used. Continue spraying until all fruit are mature.

To minimize spreading the pathogen if BFB symptoms are present, do not work fields when the foliage is wet. Use drip rather than overhead irrigation to minimize the risk of spread.

Where BFB has occurred, rotate fields out of watermelon or other cucurbit crops for at least a year. During this time, also control volunteer seedlings and cucurbit weeds.

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